FIG.1A

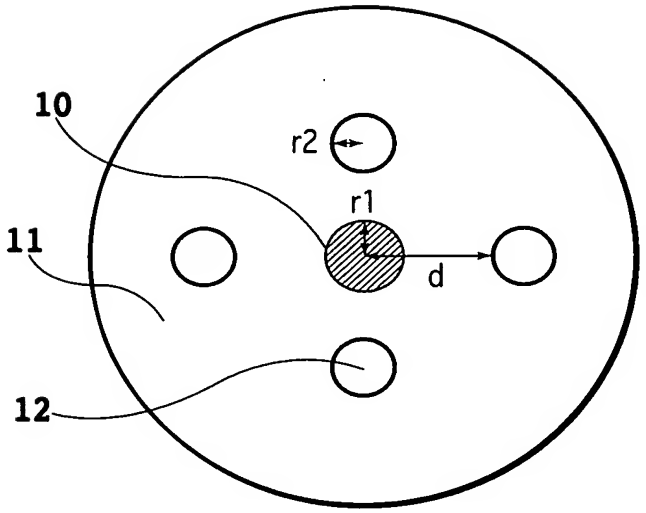


FIG.1B

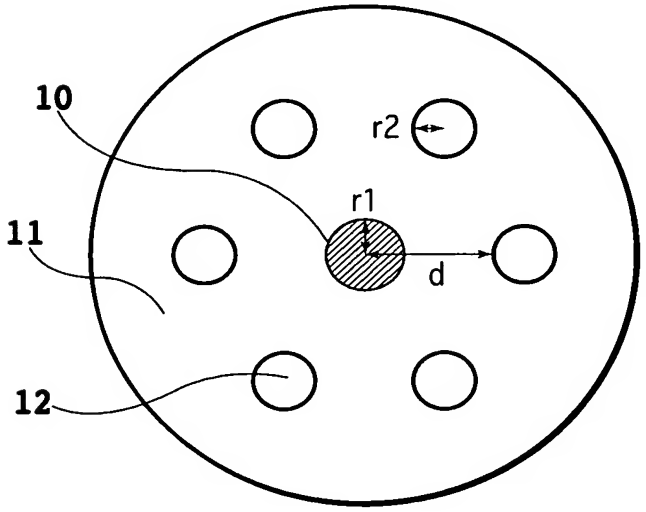
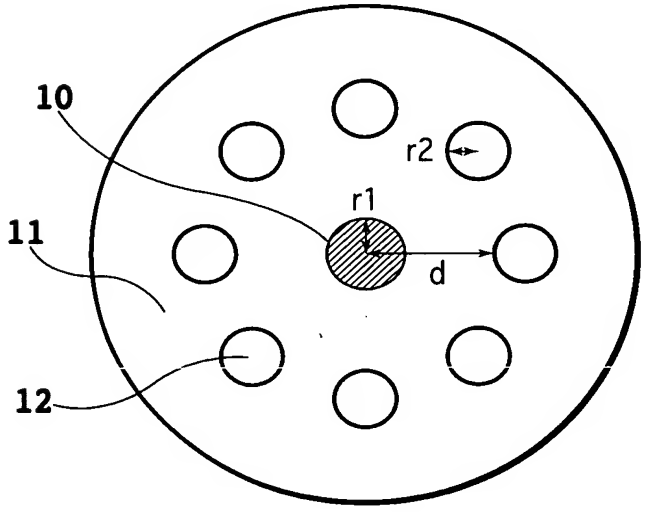


FIG.1C



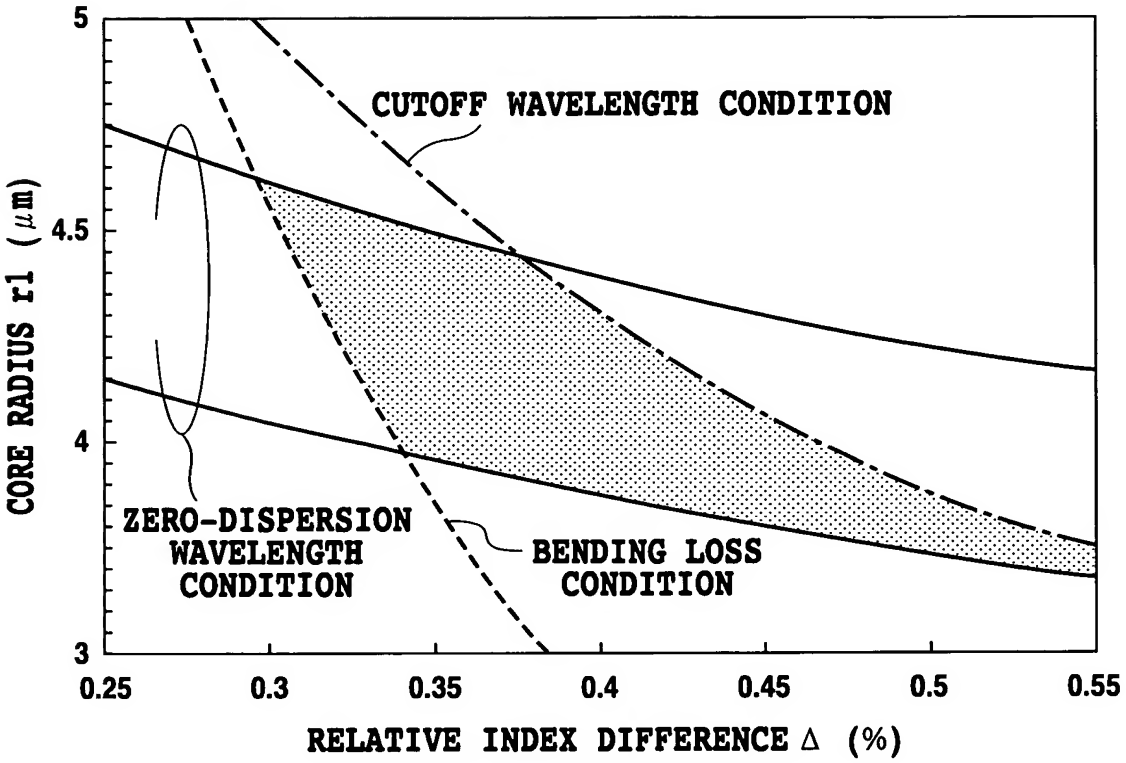


FIG.2

PRIOR ART

FIG.3A

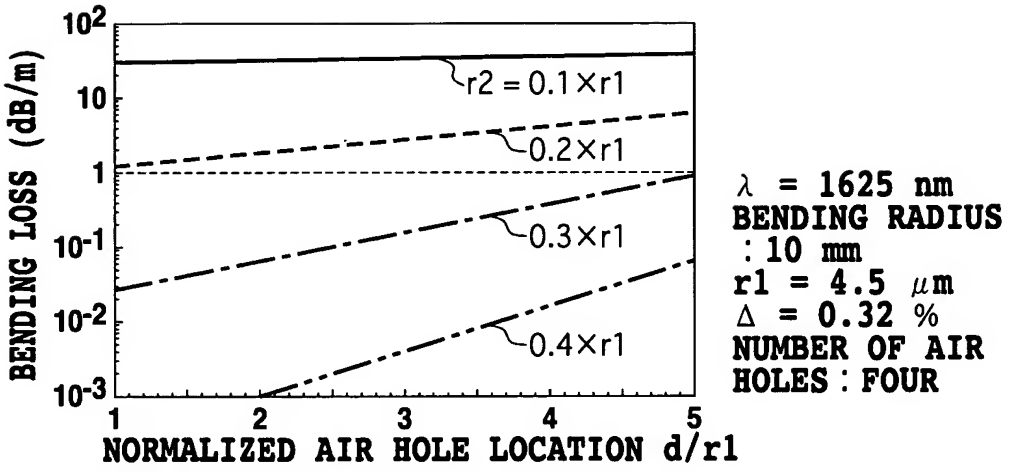


FIG.3B

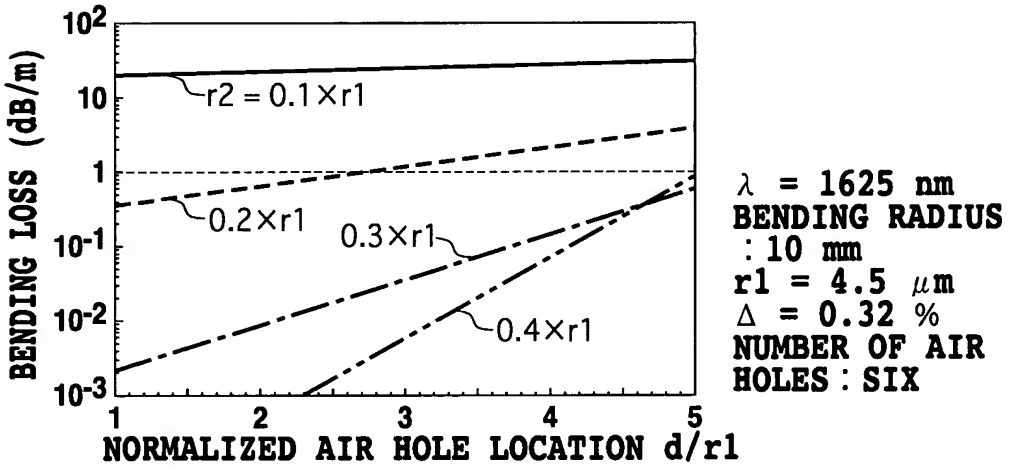
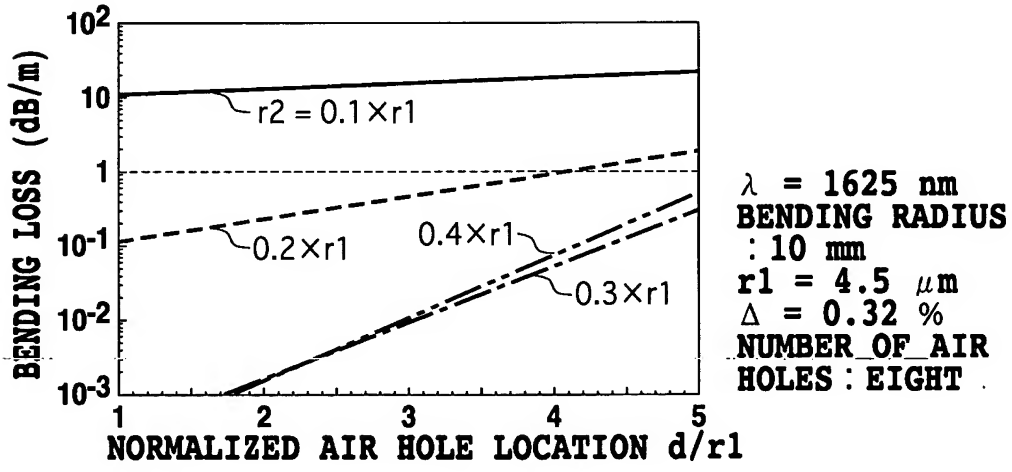


FIG.3C



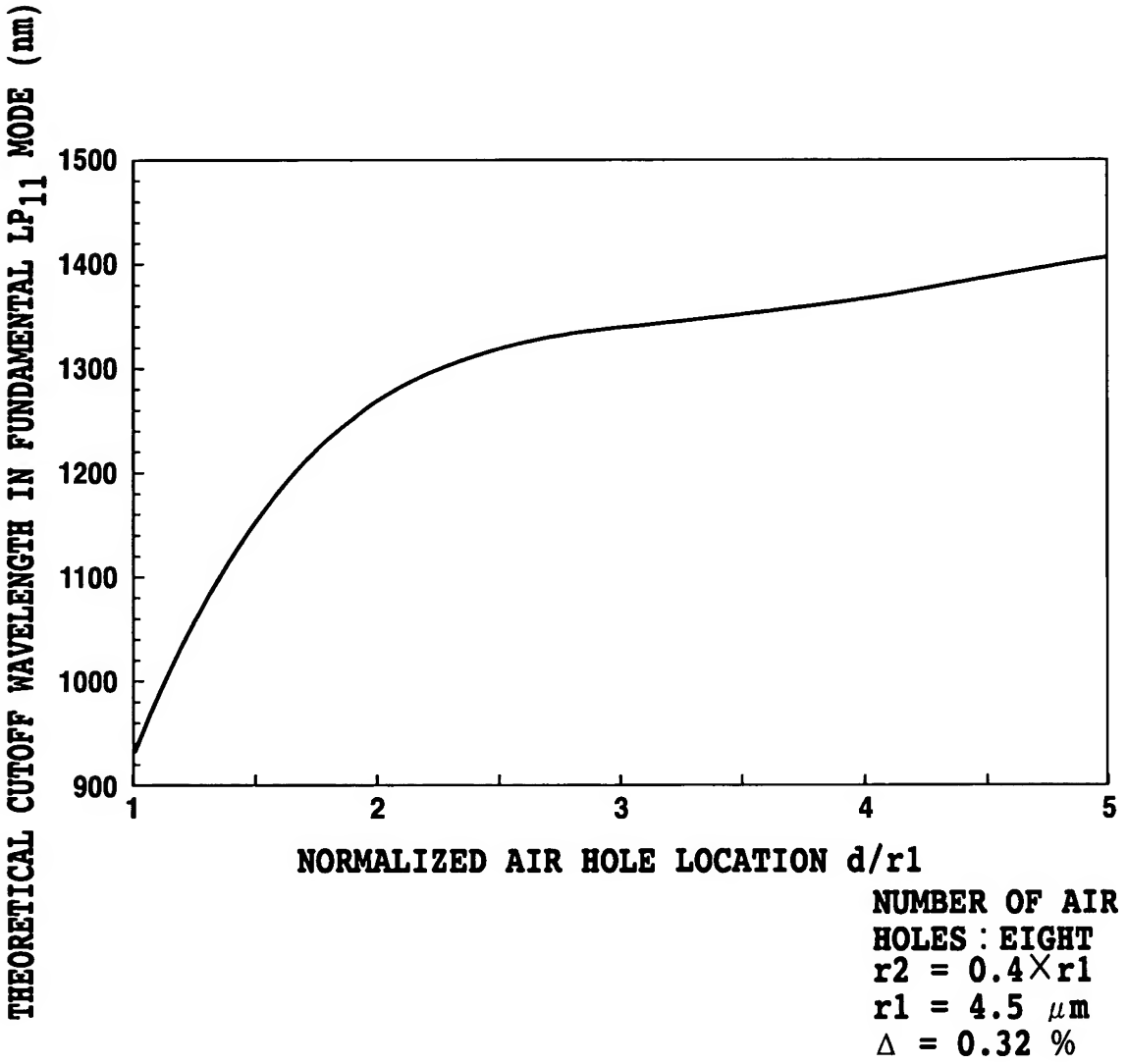

THEORETICAL CUTOFF WAVELENGTH IN FUNDAMENTAL LP_{11} MODE (nm)
1500
1400
1300
1200
1100
1000
900
1
2
3
4
5
NORMALIZED AIR HOLE LOCATION d/r1
NUMBER OF AIR HOLES : EIGHT
r2 = 0.4×r1
r1 = 4.5 μm
Δ = 0.32 %

FIG.4

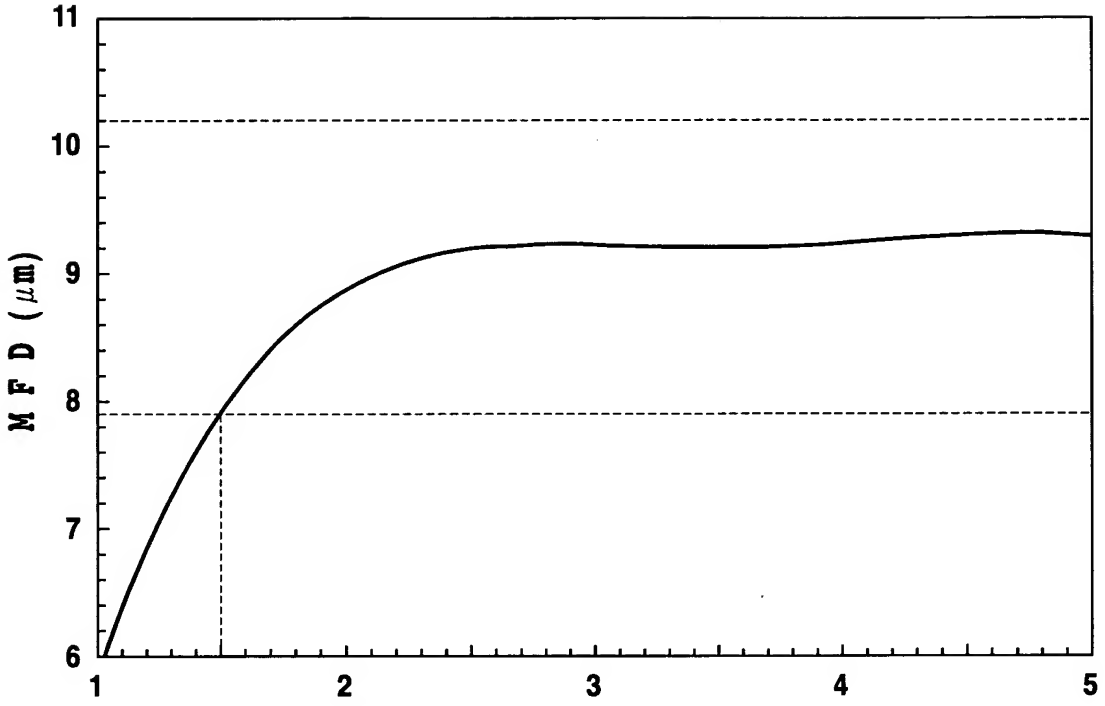

11
10
9
8
7
6
MFD (μm)
1
2
3
4
5
NORMALIZED AIR HOLE LOCATION d/r1
λ = 1310 nm
NUMBER OF AIR HOLES : EIGHT
r2 = 0.4×r1
r1 = 4.5 μm
Δ = 0.32 %

FIG.5

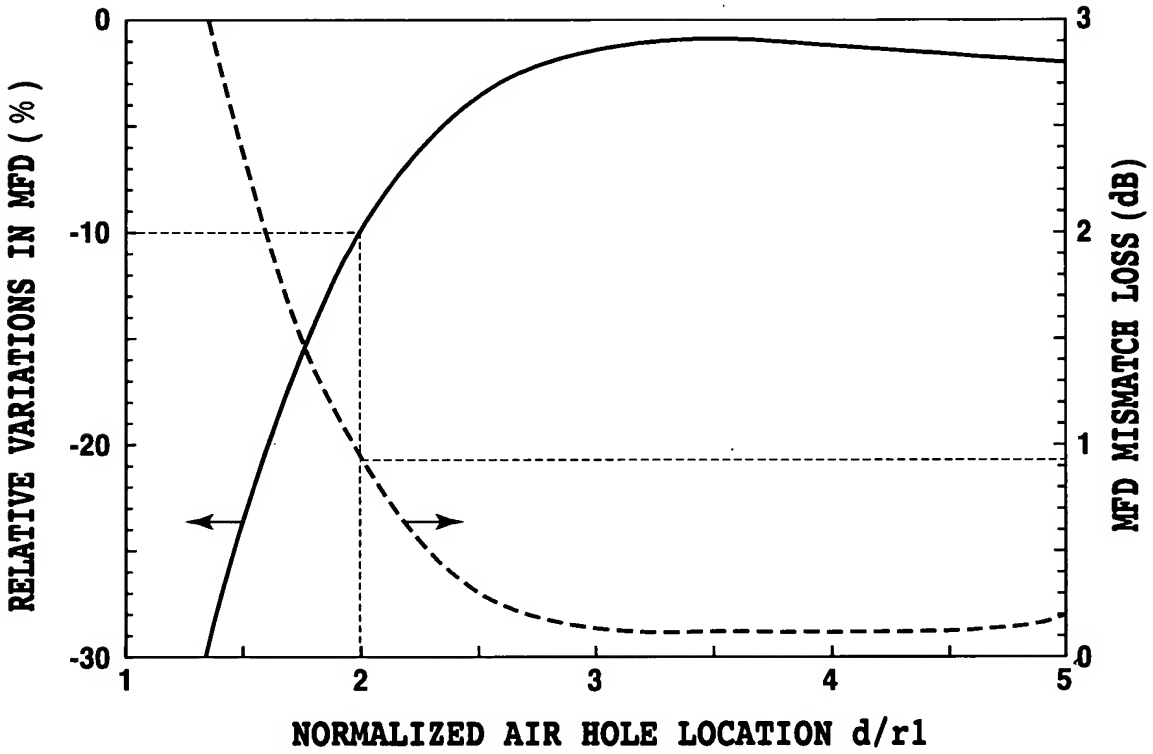

0
-10
-20
-30
1
2
3
4
5
3
2
1
0
RELATIVE VARIATIONS IN MFD (%)
MFD MISMATCH LOSS (dB)
NORMALIZED AIR HOLE LOCATION d/r1
λ = 1625 nm
NUMBER OF AIR HOLES : EIGHT
r2 = 0.4×r1
r1 = 4.5 μm
Δ = 0.32 %

FIG.6

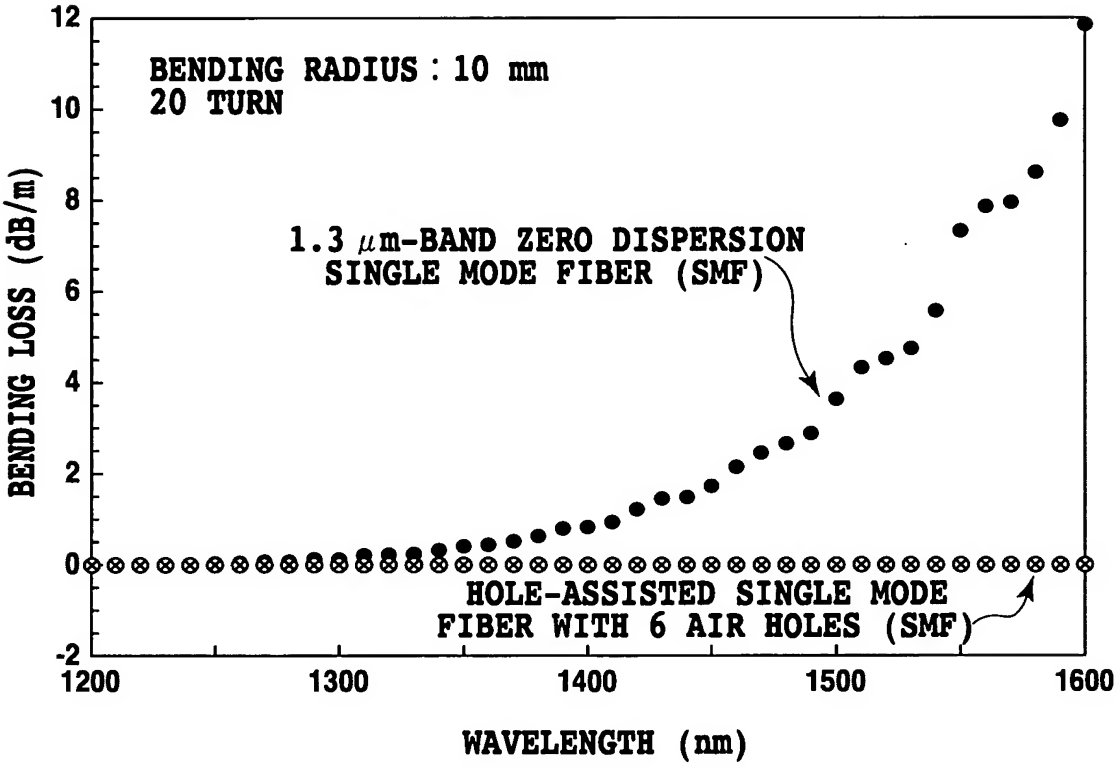

BENDING RADIUS : 10 mm
20 TURN
1.3 μm-BAND ZERO DISPERSION
SINGLE MODE FIBER (SMF)
HOLE-ASSISTED SINGLE MODE
FIBER WITH 6 AIR HOLES (SMF)
BENDING LOSS (dB/m)
WAVELENGTH (nm)
12
10
8
6
4
2
0
-2
1200
1300
1400
1500
1600

FIG.7

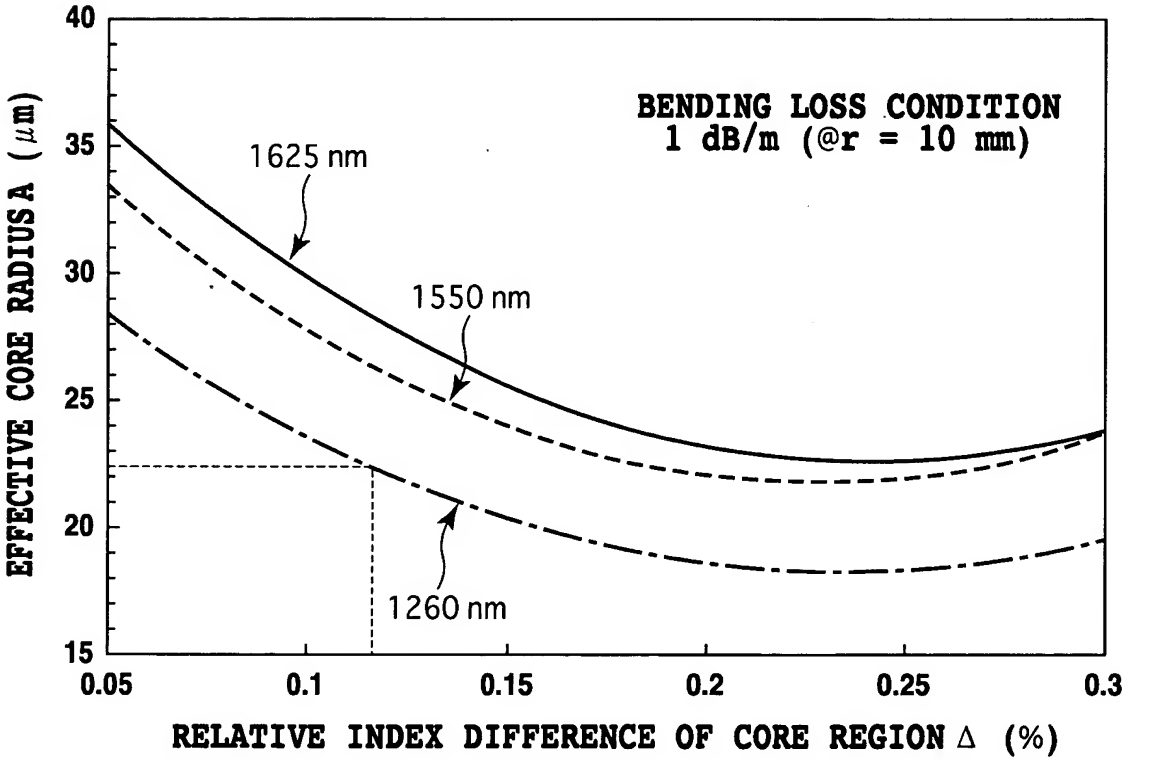

40
35
30
25
20
15
EFFECTIVE CORE RADIUS A (μm)
BENDING LOSS CONDITION
1 dB/m (@r = 10 mm)
1625 nm
1550 nm
1260 nm
0.05
0.1
0.15
0.2
0.25
0.3
RELATIVE INDEX DIFFERENCE OF CORE REGION Δ (%)
NUMBER OF AIR HOLES : SIX
d = 3×r1
r2 = 0.3×r1

FIG.8

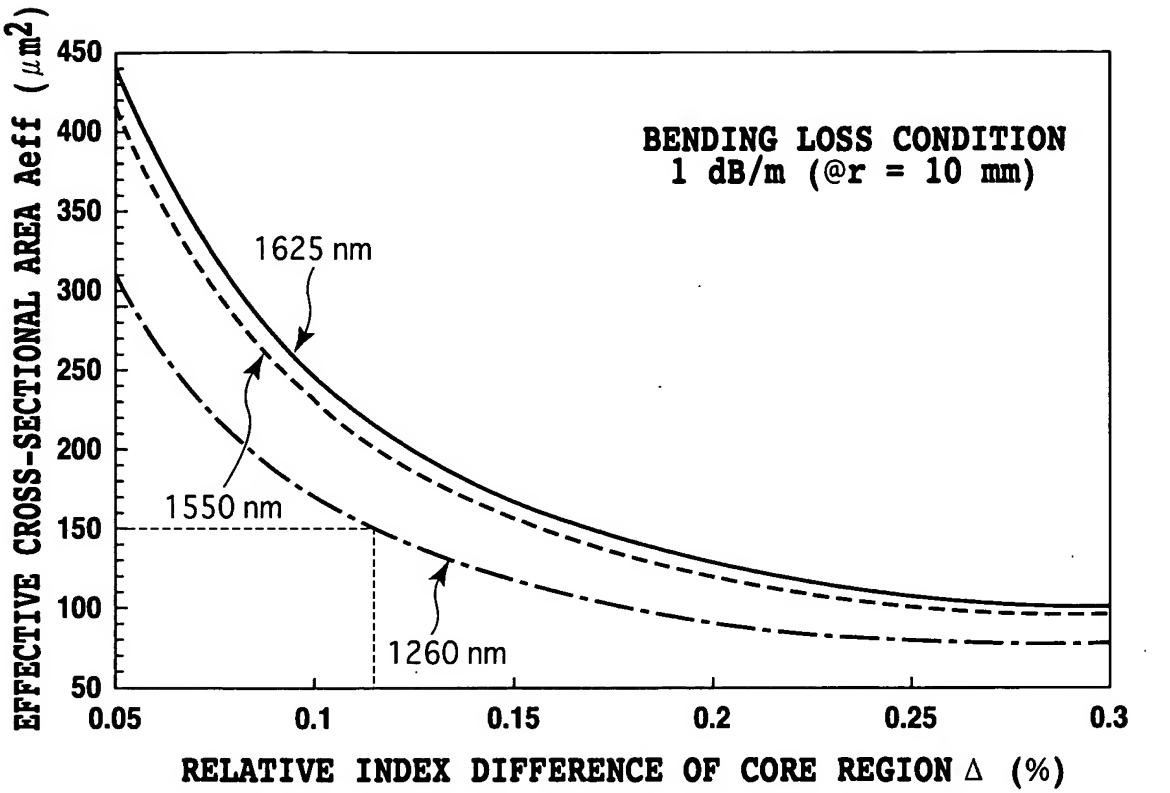

EFFECTIVE CROSS-SECTIONAL AREA Aeff (μm2)
450
400
350
300
250
200
150
100
50
0.05
0.1
0.15
0.2
0.25
0.3
BENDING LOSS CONDITION
1 dB/m (@r = 10 mm)
1625 nm
1550 nm
1260 nm
RELATIVE INDEX DIFFERENCE OF CORE REGION Δ (%)
NUMBER OF AIR HOLES : SIX
d = 3×r1
r2 = 0.3×r1

FIG.9

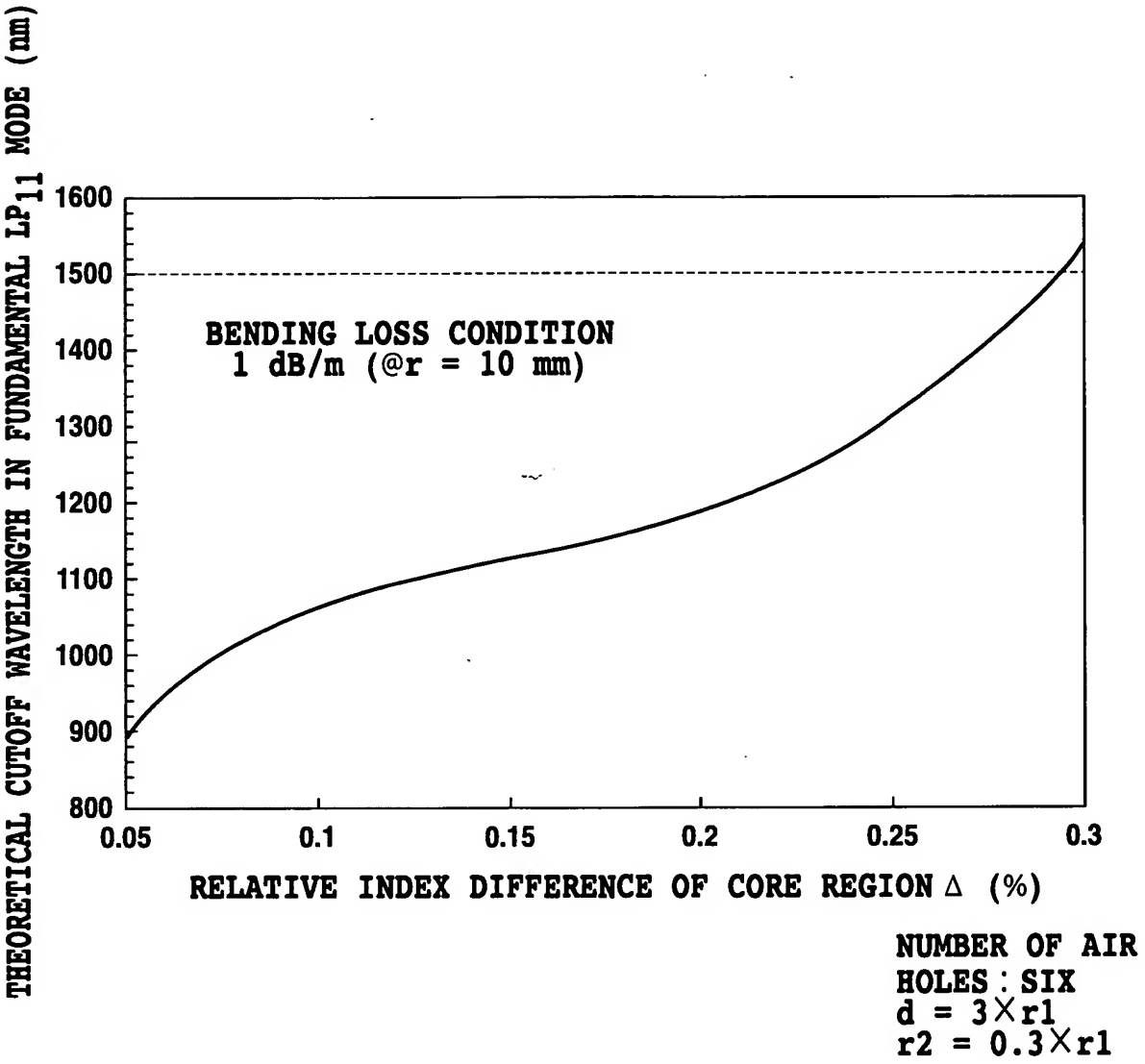

THEORETICAL CUTOFF WAVELENGTH IN FUNDAMENTAL LP_{11} MODE (nm)
1600
1500
1400
1300
1200
1100
1000
900
800
BENDING LOSS CONDITION
1 dB/m (@r = 10 mm)
0.05
0.1
0.15
0.2
0.25
0.3
RELATIVE INDEX DIFFERENCE OF CORE REGION Δ (%)
NUMBER OF AIR HOLES : SIX
d = 3×r1
r2 = 0.3×r1

FIG.10